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February 13, 2001

VIA ELECTRONIC FILING

Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th St., S.W., Counter TW-A325
Washington, D.C. 20554

Re: Written Ex Parte Presentation
ET Docket No. 99-231

Dear Ms. Salas:

On February 13, 2001, I sent the enclosed letter, via first class mail, to Chairman Michael Powell and the parties indicated below.

Pursuant to Sections 1.1206(b) and 1.49(f) of the Commission's rules, I am filing these documents electronically. If you have any questions or require any additional information, please do not hesitate to contact me at (202) 730-1340.

Respectfully submitted,

Karen L. Gulick
Counsel to Silicon Wave

enclosure

cc: Commissioner Susan Ness
Commissioner Harold Furtchgott-Roth
Commissioner Gloria Tristani
Julius Knapp, OET
Lisa Gaisford, OET
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February 8, 2001

Chairman Michael Powell
Federal Communications Commission
445 12th Street, S.W.
Washington D.C. 20554

Re: *Petition for Clarification or, In the Alternative, Reconsideration* in ET Docket No. 99-231

Dear Chairman Powell:

Silicon Wave, a leading designer and producer of RF systems on-chip for use in wireless broadband systems, strongly supports the Joint Petition for Clarification or, In the Alternative, Partial Reconsideration in this docket.[1] A signatory to the Joint Petition, Silicon Wave files these additional *ex parte* comments in support of the requested clarification. Eliminating an unnecessary barrier, the clarification will permit manufacturers to make use of adaptive hopping technologies as contemplated by section 15.247(h). This, in turn, will enhance co-existence among direct sequence spread spectrum ("DSSS") and frequency hopping spread spectrum ("FHSS") systems in the 2.4 GHz band, promoting spectral efficiency and the delivery of innovative products to the public.

Silicon Wave produces entire RF systems on chip for original equipment manufacturers serving the wireless and cable communications markets. A member of the HomeRF Working Group and an Associate member of the Bluetooth Special Interest Group, Silicon Wave created the first single-chip Bluetooth radio modem. Because the entire RF system, including both radio and digital applications, is fully integrated on a single chip, Silicon Wave's products offer the tremendous advantages of minimal power consumption and size with substantially increased cost efficiency. These advantages allow equipment manufacturers to provide consumers with high-performance advanced products where power and space are crucial, such as wireless handsets, laptops, set-top boxes and cable modems. One of the company's products, the SiW 1502 Radio Modem IC, is a 2.4 GHz radio transceiver with a GFSK modem. This low cost, low power solution integrates RF logic and Bluetooth protocol stack for a wide variety of Bluetooth applications, including links among computers, mobile phones, handheld devices, and connectivity to the Internet.

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[1] *Joint Petition for Clarification Or, In the Alternative, Partial Reconsideration*, filed by 3Com, Apple Computer, Cisco Systems, Dell Computer, IBM, Intel Corporation, Intersil, Lucent Technologies, Microsoft, Nokia, Silicon Wave, Toshiba, and Texas Instruments, ET Docket No. 99-231 (October 25, 2000).

The recently released *Report & Order*[2] in this docket modified section 15.247 to permit wideband frequency hopping in the 2.4 GHz band. Silicon Wave participated in the rulemaking not because it was opposed to the introduction of wideband systems per se, but because it wanted to assure that the increased interference from wider bandwidths would be mitigated by other technical parameters such as a sufficient decrease in power. Like the Commission, Silicon Wave endorses efficient use of the unlicensed spectrum through non-interfering co-existence among multiple technologies. Silicon Wave does not object to the rules as adopted. Silicon Wave does, however, seek a clarification of the rule that will help minimize interference among the diverse -- and recently expanded -- occupants of this band.

The Joint Petition proposes a clarification that all low-power (operating at or below 125 mW) FHSS systems in the 2.4 GHz band may use adaptive hopping techniques to minimize interference for all users of the band. Adaptive hopping is already permitted in the 2.4 GHz band, pursuant to section 15.247(h).[3] Nonetheless, other language within section 15.247 effectively precludes adaptive hopping in the 2.4 GHz band because systems must span virtually the entire band.

The Commission can resolve this unintentional conflict by clarifying that the rule similarly allows low power narrowband hoppers to use reduced hopsets. In the recent *Report and Order*, the Commission expanded operation in the 2.4 GHz band by permitting both fewer and wider hopping channels where power is otherwise significantly reduced.[4] The Commission explicitly found that a hopset of fifteen 5 MHz channels operating at 125 mW will remain within an acceptable level of inference. An identical reduction in power and hopset similarly should be acceptable for a narrowband system (1MHz or less).

Such a clarification would allow low power narrowband hoppers to use adaptive hopping, as the rules already provide in section 15.247(h). When the Commission first adopted this provision, it recognized that adaptive hopping is a valuable tool for harmonious and intensive use of the spectrum. "By avoiding operation on frequencies used by other radio services, the principle Part 15 operational requirement that the equipment not cause harmful interference to other users of the spectrum is fulfilled."[5] Section 15.247(h) permits adaptive hopping in the three spread spectrum bands at 902-928 MHz, 2.4 GHz and 5 GHz. Systems in the 900 MHz and 5 GHz bands are able to make use of this section because the maximum coverage of the bands (as factor of

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[2] *Amendment of Part 15 of the Commission's Rules Regarding Spread Spectrum Services*, First Report and Order, ET Docket No. 99-231, FCC 00-312 (rel. August 31, 2000) ("*First Report & Order*").

[3] 47 C.F.R. §15.247(h) states, in relevant part: "The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted."

[4] FHSS and DSSS systems in the 2.4 GHz band previously were limited to maximum peak output power of 1 watt. Under the revised rule, frequency hopping systems are permitted to deploy fewer than 75 channels (to a minimum of 15) if they limit their maximum peak output to 125 mW. 47 C.F.R. §15.247(b)(1)(2000).

[5] *Amendment of Parts 2 and 15 of the Commission's Rules Regarding Spread Spectrum Transmitters*, Report and Order, 12 FCC Rcd. 7488 (1997) at ¶51.

maximum bandwidth and minimum hops) is only 45% and 60% respectively.[6] For a 2.4 GHz FHSS system, however, the requirement that a 1MHz channel system span 75 of the 83.5 MHz in the band is a practical ban against the adaptive hopping otherwise contemplated and expressly permitted by the rules.

Because of this inherent contradiction, Silicon Wave believes that a clarification of the rule is warranted. A clarification best serves the public interest by facilitating flexible and intensive use of the band, as envisioned by the recent changes to permit wideband hopping. With adaptive hopping, a narrowband hopper will intelligently sense occupancy on an intended channel and modify its hop accordingly. This intelligent operation serves *all* users through reduced interference, reduced need for error correction through retransmission, and reduced occupancy time.

If the Commission for some reason believes that an additional public comment period is required on this issue, as suggested by a couple of commenters, it should immediately issue a public notice based on the Petition seeking such comments. That would allow it to promptly provide the clarification needed despite the procedural objections raised by a few.

With wideband transmissions now permitted in the band, the need for intelligence and adaptability is all the more crucial. Accordingly, Silicon Wave requests that the Commission act expeditiously to grant the Petition. Prompt action will minimize disruption caused by the new rules as narrowband hoppers seek to adapt to a new environment at 2.4 GHz.

Sincerely,

David L. Lyon, Ph.D.
Chairman and Chief Executive Officer
Silicon Wave

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[6] *See* November 30, 2000, *Ex Parte* Filing by 3Com et al, at 10.